

REMARKS

Responsive to the final Office Action dated April 4, 2007, this Amendment accompanies the filing of a Request For Continued Examination. The title has been amended with a view toward being more descriptive. Claims 1-11, 14-24, and 26-36 have been cancelled without disclaimer of the subject matter thereof. Claims 12, 13, and 25 were previously cancelled. New claims 37-61 have been added to the Application and find support at least in original claims 1-25. For new claims 37-48, see original claims 14-25. For new claims 49-61, see original claims 1-13. Presentation of new claims has been made because Applicants' careful study of the applied references and the Examiner's positions has lead Applicants to conclude that the scope of the claims could be broadened to be more in accordance with the claims originally presented for reasons discussed in the remarks which follow. The Abstract of the Disclosure has been amended to agree with the scope of the new claims. Undersigned Patent Counsel submits that no new matter is believed added by the foregoing.

Claims 37-61 are now pending in the Application and are believed to be in allowable condition for the reasons given in the following.

The rejection of claims 1-5, 7-11, 14-18, 20-24, 26-30, and 32-36 under 35 U.S.C. §103 as being unpatentably obvious over Berger et al. (US 6,528,145) in view of Nishide et al. (US 5,827,605), Zak (US 6,006,427), and Hashemi et al. (US 6,867,493) is moot in view of cancellation of these claims and is respectfully traversed regarding new claims 37-61.

The Examiner relies on the primary reference Berger et al. as teaching a "composite laminate substrate" comprising an inorganic substrate 20 having wiring 26 formed thereon and two PCB substrates (Col.10, lines 32-45, and Col. 12, lines 44-46) integrated with the inorganic substrate.

The Examiner acknowledges that Berger et al. do not teach (1) that PCB substrates are organic substrates, (2) at least one passive component formed in or on the inorganic substrate, and (3) at least one bonding layer having vias formed therein.

The Examiner therefore relies on Nishide et al. as teaching (2) at least one passive component formed in or on the inorganic substrate; on Zak as teaching (1) that PCB substrates are organic substrates; and on Hashemi et al. as teaching (3) at least one bonding layer 815 having vias 853 formed therein.

The Examiner considers that motivation to modify the teachings of Berger et al. with features from the three secondary references lies in (a) reducing cost, (b) making a more compact device, and (c) providing a more solid connection between the inorganic substrate and the PCB.

Applicants do not agree that the combined disclosures of Berger et al., Nishide et al., Zak, and Hashemi et al. set out a *prima facie* case of obviousness against new claims 37-61 (1) because Berger et al. do not teach or suggest a laminated composite substrate contrary to the Examiner's position, (2) because dissection of the teachings of the secondary reference and cherry picking useful elements is clearly not motivation but rather impermissible hindsight enabled only by a perusal of Applicants' disclosure, (3) because combining teachings from three secondary references weighs against motivation and obviousness, and (4) because, even if combined for the sake of argument, the combination does not meet Applicants'

claims since Applicants submit that Berger et al. may not be fairly said to teach or suggest a laminated composite substrate.

1. Applicants respectfully **traverse** the Examiner's position that Berger et al. teach a composite laminated substrate within the meaning of Applicants' claims. When read as a whole as a reference must be read, Berger et al. teach a composite substrate which is either multiple layers of ceramic-filled polymeric material 12 (first embodiment, Fig. 1) or multiple layers of ceramic 22 having pores 28 filled with polymer 30 (second embodiment, Fig. 2).

First Embodiment - Col. 10, lines 21-22, of Berger et al. state: "***The finished composite substrate 10 is illustrated in Fig. 1 [emphasis added].***" Fig. 1 of Berger et al. shows three ceramic-filled polymer layers. The Examiner's attention is respectfully directed to this figure, Fig. 1, which Berger et al. consider to be a finished composite substrate according to the first embodiment of the Berger et al. invention. Applicants respectfully point out that the three ceramic-filled polymer layers shown in Fig. 1 may not be said to be equivalent to Applicants' laminate including an inorganic substrate which has at least one passive component embedded therein and which is laminated to one or two organic substrates.

Further, Col. 10, lines 32-33, of Berger et al. state: "***The composite substrate is now ready for semiconductor device joining and interconnection to a PCB***". This statement is submitted to add force to Applicants' position that the finished composite substrate of Berger et al.'s first embodiment may not be said to include Applicants' inorganic substrate which has at least one passive component embedded therein. How can it? Fig. 1 of Berger et al. shows three ceramic-filled polymer layers in its finished composite substrate state. A polymer is not an inorganic material as is, for example, Applicants' inorganic substrate of ceramic, silicon or glass (see claims 38 and 50). Applicants submit that electrical connection as taught by Berger et al. is not lamination. Thus, Applicants submit that Berger et al. may not be said to teach or suggest lamination of a semiconductor device or a PCB to the finished composite substrate of

Fig. 1. Electrical interconnection is not lamination!

Additionally, the Examiner's attention is drawn to Applicants' independent claim 37 which states in pertinent part, "**... an inorganic substrate having at least one passive component embedded therein; and an organic substrate which is laminated to one side of the inorganic substrate ...** [emphasis added]." Independent claim 49 similarly recites lamination. This lamination is accomplished in claims 48 and 61 by a bonding layer, but may additionally be accomplished by other means, such as by building up the organic substrate directly on the inorganic substrate (see Applicants' claims 47 and 59). This is why Applicants prefer to recite "laminated" in independent claims 37 and 49 rather than limit the independent claims to lamination using a bonding layer as recited in claims 48 and 61.

In summary, Applicants submit that the structure of the composite laminated substrate of the present invention is distinguishable as inherently different from the finished composite substrate of the first embodiment of Berger et al. which may be electrically interconnected to semiconductor devices and/or PCBs but which is not laminated to semiconductor devices and/or PCBs.

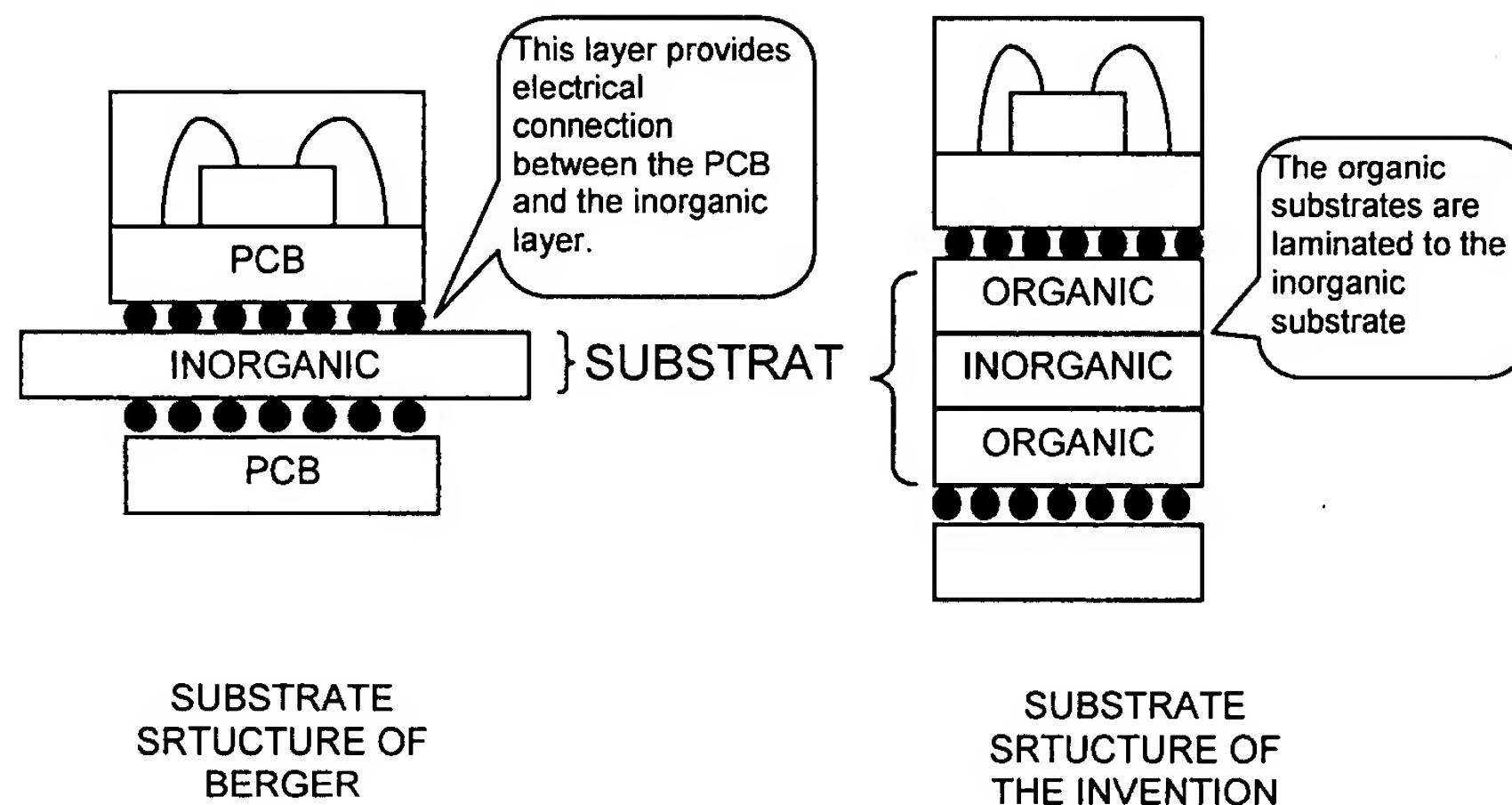
Second embodiment - Col. 12, lines 30-32, of Berger et al. state: "*Composite substrate 20 includes multiple layers of ceramic 22 having pores 28 which are filled with a polymeric material 30.*" This embodiment is shown in Fig. 2, which shows three such ceramic layers. Applicants submit that Berger et al. consider the composite structure shown in Fig. 2 to be a **finished** composite substrate according to this embodiment. In a variant of the second embodiment shown in Fig. 3, composite substrate 20' has three ceramic layers 22 with porosity 28, which are over coated with two layers of polymeric material 32 which respectively seal the outside surfaces of the composite substrate 20' and only partially infiltrates into it (see Col. 12, lines 37-43). Applicants respectfully point out that the three polymer-filled ceramic layers shown in Figs. 2 and 3 may not be said to be equivalent to Applicants' laminate including an inorganic substrate which has at least one passive component embedded therein and which is laminated to one or two organic substrates. The two layers of polymeric material 32 which respectively over

coat and seal the outside surfaces of the composite substrate 20' and only partially infiltrates into are coating layers may not be said to be organic substrates because they are neither taught nor suggested to be self supporting substrates.

Further, Col. 12, lines 43-46, of Berger et al. state, "***Polymeric material 32 is either removed from, or prevented from depositing in, areas 34 so that electrical connection can be made to a semiconductor device (not shown) or a PCB (not shown).***" This statement is submitted to add force to Applicants' position that the finished composite substrate of Berger et al.'s second embodiment may not be said to include Applicants' one or two organic substrates. How can it? Fig. 2 of Berger et al. shows three polymer-filled ceramic layers in its finished composite substrate state. The variant of Fig. 3 of Berger et al. shows three polymer-filled ceramic layers over coated with two layers of polymeric material in its finished composite substrate state. A ceramic is not an organic material.

Additionally, Applicants respectfully draw the Examiner's attention to the fact electrical connection of a semiconductor device or a PCB to a **finished** composite substrate of the second embodiment is mentioned in passing in Col. 12, lines 43-46, quoted above and is not illustrated in a figure. Applicants submit that electrical connection as taught by Berger et al. is not lamination. Thus, Applicants submit that Berger et al. may not be said to teach or suggest lamination of a semiconductor device or a PCB to the finished composite substrate of Figs. 2 or 3. Electrical interconnection is not lamination!

The situation is illustrated in the following comparative drawing to which the Examiner's attention is respectfully drawn. The second embodiment of Berger et al. is a composite of polymer-filled ceramic layers which arguably may be considered to be an inorganic composite substrate and which may be electrically connected to, but not laminated to, PCBs. However, as the comparative drawing shows, the second embodiment of Berger et al. may not be said to be equivalent to Applicants' invention as claimed.



In summary, Applicants submit that the structure of the composite laminated substrate of the present invention is distinguishable as inherently different from the finished composite substrate of the second embodiment of Berger et al. which may be electrically interconnected to semiconductor devices and/or PCBs but which may not be said to be laminated to semiconductor devices and/or PCBs.

2. Applicants submit that dissection of the teachings of the three secondary reference and cherry picking useful elements is clearly not motivation but rather impermissible hindsight enabled only by a perusal of Applicants' disclosure.

3. Applicants additionally submit that combining teachings from three secondary references weighs against motivation and obviousness.

4. Finally, even if the three secondary references are combined with Berger et al. for the sake of argument, the combination does not meet Applicants' claims since Applicants submit that Berger et al. may not be fairly said to teach or suggest a laminated composite substrate as discussed in (1) above.

For the reasons given in the foregoing, the rejection of the subject matter of Applicants' invention now embodied in new claims 37-61 on this ground does not set out a *prima facie* case of obviousness and should be withdrawn.

The rejection of claims 6, 19, and 31 under 35 U.S.C. §103 as being unpatentably obvious over Berger et al. (US 6,528,145) in view of Nishide et al. (US 5,827,605), Zak (US 6,006,427), and Hashemi et al. (US 6,867,493) as applied to claims 1 and 14 above, and further in view of Czjakowski et al. (US 6,613,978) is moot in view of cancellation of these claims and is respectfully traversed regarding new claims 42-44 and 54-56.

The Examiner relies on Czjakowski et al. for the teaching of a plurality of PCBs formed on a ceramic substrate.

Applicants do not agree that the combined disclosures of Berger et al., Nishide et al., Zak, and Hashemi et al., and Czjakowski et al. set out a *prima facie* case of obviousness against new claims 42-44 and 54-56 because the combined disclosures do not meet Applicants' claims.

Applicants' composite laminated substrate is submitted to be neither disclosed in nor suggested by any reasonable combination of the teachings of the applied references for the reasons give regarding the previous rejection discussed above, as well as because the disclosure of Czjakowski et al. does not supply the disclosure needed to meet Applicants' new claims 42-44 and 54-56.

For the reasons given in the foregoing, the rejection of the subject matter of Applicants' invention now embodied in new claims 42-44 and 54-56 on this ground does not set out a *prima facie* case of obviousness and should be withdrawn.

CONCLUSION

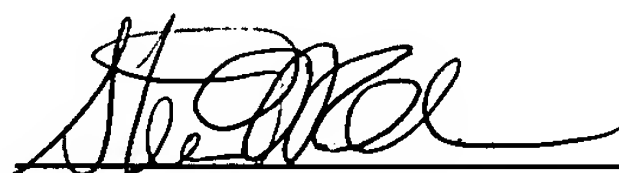
In view of the foregoing amendments and remarks, it is requested that the rejections of record be reconsidered and withdrawn, that new claims 37-61 be allowed, and that the Application be found to be in allowable condition.

Should the Examiner not find the Application to be in allowable condition or believe that a conference would be of value in expediting the prosecution of the Application, Applicants request that the Examiner telephone undersigned Counsel to discuss the case and afford Applicants an opportunity to submit any Supplemental Amendment that might advance prosecution and place the Application in allowable condition.

An RCE fee of \$790.00 is enclosed by way of credit card form PTO-2038. Should the remittance be insufficient or missing, please charge such fee to Deposit Account No. 18-0002 and advise us accordingly.

Respectfully submitted,

September 4, 2007
Date



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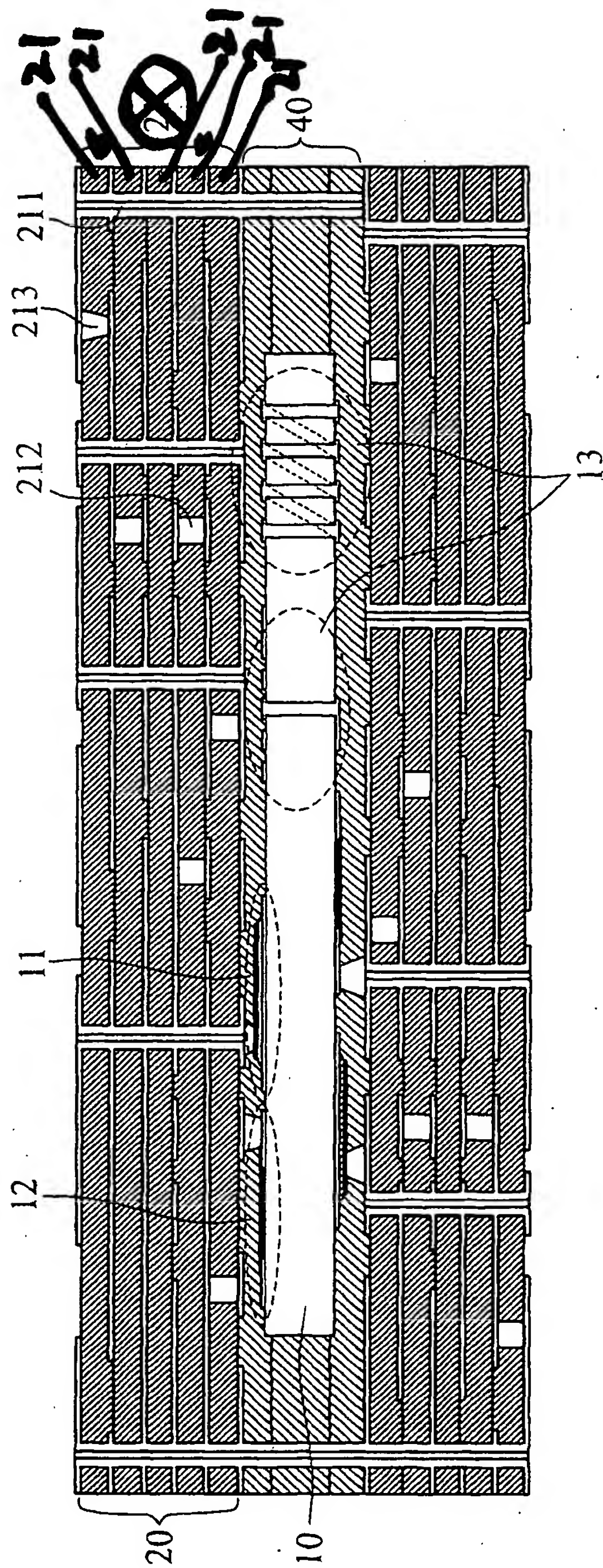


FIG. 3

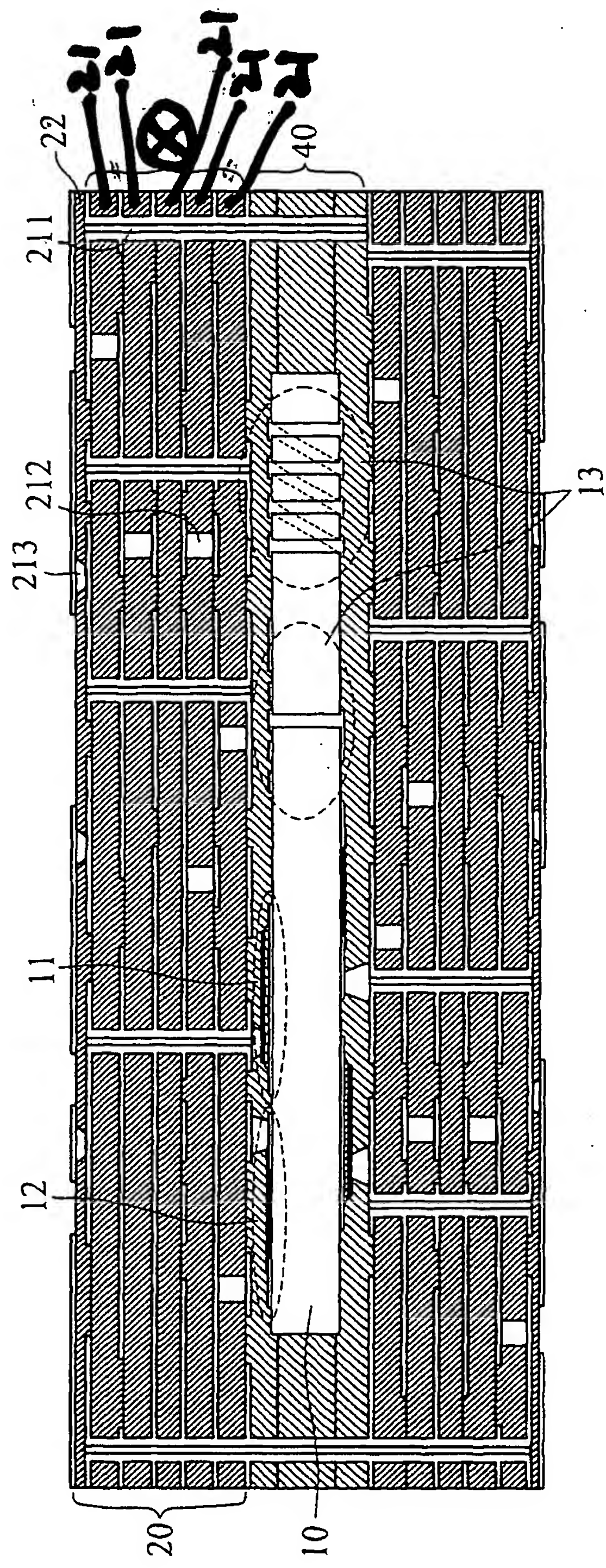


FIG. 5